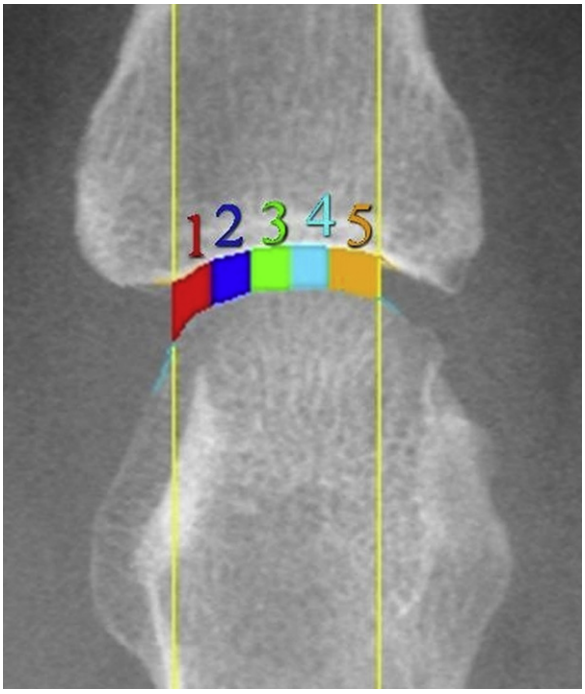

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ASSOCIATION BETWEEN DISABILITY AND BONE MARROW ABNORMALITIES IN EARLY STAGE OF KNEE OSTEOARTHRITIS

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Purpose: Current treatments for knee osteoarthritis (OA) are essentially treatments for symptom. It is now recognized that one key outcome measure for any intervention for OA is the change detected in patient based outcome and health related quality of life (HRQOL). The plain radiograph is relatively insensitive, only provides a historical view of the skeletal damage that has already occurred, and does not allow for the early joint damage. In addition, often weak associations have been reported between symptom and radiographic change. Magnetic resonance imaging (MRI) has potential to overcome these limitations of radiography. The global goal of our study is to find out factors that affect the health related quality of life of patients with knee OA. Based on an idea, the aim of this study was to investigate whether the joint abnormalities detected by MRI were associated with HRQOL of patients with early stage of knee OA.

Methods: 120 participants (female; 108, male; 12, 64.4 y on average) with early stage of medial knee OA (K/L 1; 36, K/L 2; 84) were recruited. All patients had complained of pain in the study knee for at least the preceding month. All studies were performed with 1.5-Tesla MRI system. Coronal and sagittal fat-suppressed T2-weighted images were also obtained to evaluate the bone marrow abnormalities (BMAs). OA changes, such as (1) cartilage morphology, (2) BMAs, (3) bone cysts, (4) bone attrition, (5) meniscal pathology and (6) osteophytes, were scored by MRI. BMAs were independently analyzed using the whole-organ MRI scoring method (WORMS) as reported previously. Each parameter was semi-quantitatively scored from 0 to 3 in 10 tibio-femoral subregions. The HRQOL of participants was measured using the Japanese Knee Osteoarthritis Measure (JKOM), which was created as an outcome measure for Japanese patients with knee OA and has proven to have sufficient reliability and validity. The JKOM is a patient-based, self answering evaluation score that includes of 4 subcategories: category II; pain and stiffness, III; activities of daily living, IV; social activities, and V; general health conditions with 100 points as the maximum score. JKOM is higher in patients with more pain and physical disabilities.

Results: A simple regression analysis was performed between each JKOM scores and WORMS scores. No cartilage morphology scores, bone cyst scores, bone attrition scores, meniscal pathology, and osteophyte scores were associated with JKOM total scores and its subcategory scores. On the other hand, BMA scores in MFC were significantly associated with both JKOM category III ($r=0.39$, $p=0.03$) and IV scores ($r=0.16$, $p=0.02$), respectively. When the subjects were divided into two groups based on the presence or absence of BMAs. The JKOM category III (15.0) and IV (10.0) scores in patients with BMAs in MFC were significantly increased in comparison to those without BMAs in MFC [9.6 ($p=0.03$) and 6.7, ($p=0.02$)], respectively.

Conclusions: The BMAs can be detected from early to end-stages of knee OA, and are suggested to be associated with pain, cartilage defects, and the progression of cartilage loss. However, whether BMAs can also be associated with activity and/or condition in daily life of patients with primary knee OA is still remained unclear. In this study, it was found the association between BMA in MFC and disability evaluated by JKOM score of the early stage of medial type of knee OA. It is still unclear why and how patients with BMA was disordered their activity. Although the pathogenesis of BMAs is also unknown, BMAs are associated with weight-bearing knee pain. BMAs are speculated to be reflected by compartment-specific load most probably due to malalignment. While pain VAS score was not associated BMA scores of the participants of this study, weight-bearing pain may, at least in part, induce disability of the patients with knee OA, especially early stage of knee OA. In conclusion, BMA in MFC was associated with disability early stage knee OA.